Appendix C

RESULTS OF SANDAG SAND NOURISHMENT PROJECT RELEVANT TO EXTENSION OF AGUA HEDIONDA LAGOON JETTY

RESULTS OF SANDAG SAND NOURISHMENT PROJECT RELEVANT TO EXTENSION OF AGUA HEDIONDA LAGOON JETTY

by

Coastal Environments

for

Montgomery Watson Harza
1340 Treat Boulevard, Suite 300
Walnut Creek, CA 94597

COASTAL ENVIRONMENTS
2166 Avenida de la Playa, Suite E
La Jolla, CA 92037

10 November 2004
CE Reference No. 04-20

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

RESULTS OF SANDAG SAND NOURISHMENT PROJECT RELEVANT TO EXTENSION OF AGUA HEDIONDA LAGOON JETTY

1.0 INTRODUCTION

In 1993, the San Diego Association of Governments (SANDAG) began its "Shoreline Preservation Strategy for the San Diego Region," with the intention of restoring sand to beaches within San Diego County (SANDAG, 1993). In 2001, the Regional Beach Sand Project (RBSP) was implemented, placing 2.1 million cubic yards of sand on 12 receiving beaches between 6 April and 23 September 2001 (Moffat & Nichol, 2000). From 2001 to 2003, the Regional Beach Monitoring Program (RBMP) was responsible for tracking the success of the project (Coastal Frontiers, 2004). Using the RBMP's 2003 annual report as a guide, we took an in-depth look at the project's effects on the Agua Hedionda Lagoon inlet and adjacent beaches.

2.0 BEACH CHANGES AT NORTH CARLSBAD BEACH

The RBSP placed 225,000 cubic yards of sand on North Carlsbad Beach (Figure C-1) between 6 July and 2 August 2001 and gave 421,000 cubic yards to Oceanside between 24 August and 23 September 2001 (Noble, 2001). Due to sand deposition within the Agua Hedionda Lagoon, the lagoon West Basin was dredged 2001 and 2003. The dredged sand was returned to the adjacent beaches. This process occurs every one to two years.

The Agua Hedionda Lagoon inlet was dredged between November 2000 and April 2001, with sediment amounting to 429,084 cubic yards. However, this excavation was completed before the beginning of the RBSP; therefore, it was unrelated to the sand fill activities of the project. The second dredging occurred between December 2002 and April 2003, when 336,857 cubic yards were removed.
Further from dredging Oceanside Harbor entrance a total of 918,000 cubic yards of sand was placed on Oceanside beaches (Table C-1).

As a result of beach fills during the course of the program, the Oceanside Littoral Cell has shown overall gains in beach sand (Coastal Frontiers, 2004). The area experienced an average advance in beach width of 21 ft for the 33 transects in the cell. The beaches immediately north of the Agua Hedionda Lagoon inlet showed an overall increase in beach width from Spring 2001 (before the sand fill) to Fall 2003 (after the sand fill and program), as follows: at CB-830, +27 ft; at CB-840, +11 ft; at CB-850, +54 ft; and at OS-900, +60 ft. Overall, North Carlsbad has shown an overall gain of beach sand while South Carlsbad did not retain the deposited sediment. North Carlsbad's gains are believed to be due to the Oceanside fill as well as the Carlsbad fill.

3.0 RESPONSE OF AGUA HEDIONDA JETTY TO SAND NOURISHMENTS

Agua Hedionda jetties are designed to be short in order to minimize impacts on longshore sand transport (Jenkins and Skelly, 1988). Table C-2 presents beach width changes at North Carlsbad for ranges CB-0830, CB-0840, CB-0850, CB-0865, and CB-0880 for the fall and spring surveys. The surveys conducted in the spring represent beach conditions after the winter season. The fall surveys represent beach conditions after the summer season. Table C-3 gives average beach widths before and after sand placement.

Relevant to this EIR is the change in beach width at Range CB-0830, which showed a 27.5% increase after the winter season, and an increase of 1% after the summer season. The increase in beach width after the winter season was due to the presence of the existing Agua Hedionda Lagoon north jetty, which prevented the sand from moving further to the south. During the winter, longshore sand transport is predominantly to the south. Even so, it did trap some sand upcoast. Figure C-2 shows the changes in beach profile at Range CB-0830, and Figure C-3 shows the shoreline changes north and south of the inlet channel at Agua Hedionda Lagoon between April 2001 and November 2003. Notice the accretion of the north beach after the winter season (May 2002 and May 2003) in response to the southerly longshore transport of sand.

4.0 EFFECT OF SANDAG SAND PLACEMENT ON AGUA HEDIONDA LAGOON SEDIMENTATION

Coastal Frontiers (2004) reviewed dredging records for Agua Hedionda Lagoon before and after sand placement on the beach. They concluded that a comparison of these records with the historical average of 143,000 yd^3/yr revealed an increase of 49,000 yd^3/yr over the course of the program. These numbers were modified slightly in a presentation given by Leidersdorf et al. (2004) at the H2O conference in Long Beach on 28 October 2004, where the difference in the volume of sand dredged from Agua Hedionda Lagoon was adjusted to 38,000 yd^3. They also stated that the impact of the extra dredging volume is negligible when the increased cost and labor involved in dredging sediment from the lagoon inlet is compared with the benefits of the SANDAG project on North Carlsbad and City of Oceanside beaches.

5.0 REFERENCES

Coastal Frontiers, 2004. SANDAG 2003 Regional Beach Monitoring Program, Annual Report. Report prepared for SANDAG, San Diego, California.

Leidersdorf, C., R. Hallar, G. Hearon, and R. Rundle, 2004. The Impact of Beach Nourishment on Lagoon Entrances in San Diego County. PowerPoint presentation at H20 Conference, Long Beach, California, 27-29 October 2004. SANDAG, 2000.

Jenkins, S. A., D. W. Skelly, 1988. An Evaluation of the Coastal Data Base Pertaining to Seawater Diversion at Encina Power Plant, Carlsbad, California. Prepared for San Diego Gas & Electric Co., Carlsbad, CA, July 19988. 56 pp.

Moffat & Nichol, 2000. Final Report, Shoreline Morphology Study, San Diego Regional Beach Sand Project. Prepared for KEA Environmental, March 2000. 117 pp. + 12 appendices.

San Diego Association of Governments (SANDAG), 1993. Shoreline Preservation Strategy for the San Diego Region. 96 pp. + 3 appendices.

Table C-1. Sand placement on Oceanside Beach from dredging of Oceanside Harbor between 2001 and 2003.

Bypass Product	Date	Placement Location	Bypass Quantity (cy)
Oceanside Harbor	2001	Oceanside	80,000
	2002	Oceanside	400,000
	2003	Oceanside	438,000

Note: Average annual bypass rate at Oceanside Harbor = 306,000 cy/yr.

Table C-2. Beach width changes at North Carlsbad.

Transect	Fall (ft)				Spring (ft)		
	2000	2001	2002	2003	2001	2002	2003
CD-0830	97	83	133	166	139	148	158
CD-0840	83	98	125	148	137	152	176
CD-0850	113	153	180	193	129	142	174
CD-0865	.[a]	192	198	187	82	149	151
CD-0880	120	151	166	181	97	186	168

[a] **dotted means no data.**

Table C-3. Average change in beach width at North Carlsbad Beach before and after SANDAG sand nourishment project (2001).

Transect	Before Fall 1984 – Spring 2002		After Fall 2000 – Spring 2003		Percent Change [a] (%)	
	Fall	Spring	Fall	Spring	Fall	Spring
CD-0830	119	117	120	148	1	2.5
CD-0840	83	121	114	155	37	28
CD-0850	113	113	160	148	42	31
CD-0865	.[b]	.	159	127	.	.
CD-0880	112	110	155	150	38	36

[a] **Percent calculated from (after – before) / before x 100.**
[b] **dotted means no data.**

Insert Figure C-1, Location map of North Carlsbad and Oceanside receiver sites for SANDAG project (2001) (from Coastal Frontiers Corporation, 2004).

Insert Figure C-2, Beach profiles at Range CB-0830, located just north of Agua Hedionda Lagoon, for the period between Fall 2001 and Fall 2003 (from Coastal Frontiers, 2004).

Insert Figure C-3, Agua Hedionda Lagoon north entrance, April 2001 through November 2003. Notice sand accumulated north of the jetty as a result of the SANDAG sand placement project in 2001 (from Coastal Frontiers, 2004).